UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802- 4213

SEP - 4 2003

In Reply Refer To:
SWR-02-SA-6441:FKF

Mr. Gary N. Hamby
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
California Division
980 Ninth Street, Suite 400
Sacramento, California 95814-2724

Dear Mr. Hamby:

This document transmits the National Marine Fisheries Service's (NOAA Fisheries) biological opinion (Enclosure 1) based on our review of the proposed State Route (SR) 99 Safety and Operational Improvement project, located in Sutter County, and its effects on threatened Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*) and threatened Central Valley steelhead (*O. mykiss*) in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Your January 30, 2003, request for formal consultation was received on February 10, 2003.

This biological opinion is based on information provided in the November 2002 Biological Assessment; the June 2002 Draft Environmental Impact Report/Environmental Assessment; and a site visit, phone calls, and emails involving NOAA Fisheries and Caltrans staff. A complete administrative record of this consultation is on file at the NOAA Fisheries, Sacramento Area office.

Based on the best available scientific and commercial information, the biological opinion concludes that this project is not likely to jeopardize the continued existence of Central Valley spring-run Chinook salmon and Central Valley steelhead. No critical habitat currently is designated for either species. NOAA Fisheries also has included an incidental take statement with reasonable and prudent measures and non-discretionary terms and conditions that are necessary and appropriate to minimize incidental take associated with the project.

Also enclosed are Essential Fish Habitat (EFH) conservation recommendations for Pacific salmon as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSA) as amended (16 U.S.C. 1801 *et seq.*; Enclosure 2). This document concludes that the SR 99 Safety and Operational Improvement Project will adversely effect the EFH of Pacific salmon in the action area and adopts selected terms and conditions and ESA conservation recommendations

of the biological opinion as the EFH conservation recommendations. Section 305(b)4(B) of the MSA requires the Federal Highway Administration (FHWA) to provide NOAA Fisheries with a detailed written response within 30 days, and 10 days in advance of any action, to the EFH conservation recommendations, including a description of measures adopted by FHWA for avoiding, minimizing, or mitigating the impact of the project on EFH (50 CFR 600.920[j]). In the case of a response that is inconsistent with our recommendations, FHWA must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NOAA Fisheries over the anticipated effects of the proposed action and the measures needed to avoid, minimize, or mitigate such effects.

If you have any questions about this consultation please contact Ms. F. Kelly Finn in our Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, CA 95814. Ms. Finn may be reached by telephone at (916) 930-3600 or by fax at (916) 930-3629.

Sincerely,

Rodney R McInnis

Rodney R. McInnis
Acting Regional Administrator

Enclosures (2)

cc: NOAA Fisheries-PRD, Long Beach, CA
Stephen A. Meyer, ASAC, NOAA Fisheries, Sacramento, CA
Chris Collison, California Department of Transportation–Environmental Division,
2389 Gateway Oaks Drive, Suite 100, Sacramento CA 95833

Enclosure 1

BIOLOGICAL OPINION

ACTION AGENCY:	U.S. Department of Transportation Federal Highway Administration (FHWA)
ACTIVITY:	State Route (SR) 99 Safety and Operational Improvement Project
CONSULTATION CONDUCTED BY:	National Marine Fisheries Service (NOAA Fisheries), Southwest Region

SEP - 4 2003

I. CONSULTATION HISTORY

FHWA requested formal consultation on their proposed SR 99 Safety and Operational Improvement project in Sutter County on January 30, 2003. The letter was received by NOAA Fisheries, Sacramento Area Office, on February 10, 2003, and was accompanied by a biological assessment of the project (California Department of Transportation [Caltrans] 2002).

II. DESCRIPTION OF THE PROPOSED ACTION

The FHWA and Caltrans propose to widen SR 99 in Sutter County from a two-lane to a four-lane freeway in order to accommodate heavy traffic and improve highway safety. The objectives of the project are to improve traffic safety and accommodate the existing and future volumes of traffic at a level of service "D" or better. Additionally, the project would provide right-of-way for future growth (Caltrans 2001). This project is one part of Caltrans' goal to provide overall improvement of the Sacramento to Chico corridor. The goal also includes completion of the Marysville to Oroville freeway upgrade and the State Route 149 highway project (Sacramento Area Council of Governments and the Butte County Association of Governments 1990).

The proposed SR 99 Safety and Operational Improvement Project would begin at the intersection of SR 99 and SR 70 in Sutter County and extend north to O'Banion Road. The proposed project would widen the highway and bypass the town of Tudor to the south with a new alignment. The project is separated into four segments; construction would begin in 2005 for Segment 1 and 2007 for Segment 2. Segment 3 was completed in 2000 under a separate environmental document and Segment 4 does not contain any waters of the U.S. and will not require consultation with NOAA Fisheries. Therefore, Segments 3 and 4 will not be discussed further in this opinion.

Segment 1 involves widening to the east of existing SR 99 and crosses Coon Creek, Ping Slough, and several irrigation ditches. Segment 2 continues widening SR 99 to the east just south of

Nicolaus Road and includes construction of a new bridge across the Feather River. The new bridge would cross the Feather River (including Nelson Slough) and its north and south levees, and the California Department of Fish and Game's (DFG) Feather River Wildlife Area. Construction of Segment 2 is expected to require three seasons, and would be completed in the fall of 2009.

A. Pre-Construction Activities

Prior to bridge construction, drilling would be done in the vicinity to obtain structural design information. Caltrans proposes to drill 30 boreholes east of and within100 feet of the existing bridge (i.e., along the length of the new bridge site). Drilling would occur within the active channel of the Feather River and the upland sand bar between the river and Nelson Slough. Approximately eight boreholes would be drilled in the active channel. Boreholes would be approximately 5 inches in diameter and up to 200 feet in depth, and would be drilled using truck-mounted drill rigs. Holes in the channel would be allowed to fill back in with the removal of the drill; other holes would be filled in with a lean concrete and bentonite mix or by backfilling with bentonite chips. Drilling in the live channel of the river would be done from the existing bridge deck, and would create noise levels in the water of approximately 105 decibels (dB). After drilling, a rod would be hammered for approximately one minute and a sediment core extracted; the hammering would create noise levels of approximately 130 dB. This process would occur a few times at each borehole. Drill fluids and cuttings would be placed in drums for disposal off-site at an approved facility.

B. Construction Activities

The new bridge would be supported by 18 piers, with 12 piers being constructed in the active stream channel, including 2 in the backwater slough area south of the Feather River. No piers will be constructed in Nelson Slough. Each pier is expected to be approximately 16.4 feet in diameter, and the permanent fill for each pier would be approximately 0.02 acres, for a total fill in the active stream channel and slough of approximately 0.25 acres. The new bridge would be placed east of the existing bridge, and the new piers would be placed parallel to the existing bridge piers to minimize additional streamflow disturbance.

Bridge construction will require the installation and use of a temporary trestle, falsework, and cofferdams. Caltrans estimates that these would result in a maximum of approximately 0.5 acres of temporary fill in the active channel, and 3 acres of temporary excavation impacts for the new piers in the DFG Feather River Wildlife Area. Temporary disturbance to 30 acres of the wildlife area from construction-related facilities such as sediment basins and equipment storage areas also is expected to occur.

The temporary trestle would consist primarily of a wood platform supported by metal beams and piles, and would allow a crane and driver to sit adjacent to the bridge pier being constructed. Although construction materials generally are expected to be removed from the Feather River

channel by October 15 of each year, the trestle may be left in place for the entire 3-year construction period pending approval by the Reclamation Board (Chris Collison, Caltrans, pers. comm., 2003). Once construction is completed, the trestle, including the supporting piles, will be removed from the channel.

Cofferdams will be installed to construct the bridge footings and piers within the wetted channel of the Feather River. Falsework would be constructed around the piers and footings to construct the bridge deck. Erecting cofferdams would require de-watering the work area, typically by damming the flow upstream from the site with sand bags full of clean gravel or sand. A pipe would be used to divert flow around or through the project area. This also would be done at Coon Creek and Ping Slough during culvert work if any surface water is present.

Cofferdam sheet piles and the small-diameter (i.e., two feet) piles of the temporary trestle would be vibrated into place (Chris Collison, Caltrans, pers. comm., 2003). Pile driving the larger bridge piles would occur using a diesel hammer and one of two methods. The first method would be to drive piles cast in steel, and the second method would be to pile drive within a cofferdam. The cast-in-steel method does not include dewatering and would require approximately four days per pier of pile driving and welding for a total of 48 days. The within-cofferdam method would require approximately five days per pier for a total of 60 days. Caltrans estimates that there would be a maximum of 32 days of pile driving per season for two seasons.

The staging area for construction equipment would be located under the existing bridge on the north side of the Feather River. This proposed staging area was used during the widening of the existing bridge in 1998. A temporary construction easement would provide for access to the new bridge, equipment storage, and creation of sediment basins to contain the water pumped out of the areas enclosed by the cofferdams. Water pumped into the basins would filter slowly through the alluvium substrate, removing suspended material, before it re-enters the system.

Culvert work is planned at eleven locations – Coon Creek, Ping Slough, and nine irrigation ditches. The existing culverts would be left in place and lengthened by approximately fourteen meters. Lengthening would occur on the east side of each culvert, with some minor inlet/outlet repair on the west side.

C. Proposed Conservation Measures

Construction on Segment 1 involving the culverts at Coon Creek and Ping Slough is expected to be completed during the summer when the channels are dry. Construction of Segment 2 involving the Feather River bridge construction will be completed over three seasons utilizing an in-channel work window of July 1 - October 15, which is proposed to minimize impacts to salmonids.

Best management practices (BMPs) would be used to minimize impacts to water quality and habitat degradation from construction activities. Such BMPs include use of erosion control

that, historically, there were approximately 2,000 miles of salmon habitat available prior to dam construction and mining and that only 18 percent of that habitat remains.

Adult spring-run Chinook salmon enter the Delta from the Pacific Ocean beginning in January and enter natal streams from March to July. In Mill Creek, Van Woert (1964) noted that of 18,290 spring-run Chinook salmon observed from 1953 to 1963, 93.5 percent were counted between April 1 and July 14, and 89.3 percent were counted between April 29 and June 30.

During their upstream migration, adult Chinook salmon require streamflows sufficient to provide olfactory and other orientation cues used to locate their natal streams. Adequate streamflows are also necessary to allow adult passage to upstream holding habitat. The preferred temperature range for upstream migration is 38 °F to 56 °F (Bell 1991; DFG 1998).

Upon entering fresh water, spring-run Chinook salmon are sexually immature and must hold in cold water for several months to mature. Typically, spring-run Chinook salmon utilize mid- to high-elevation streams that provide appropriate temperatures and sufficient flow, cover, and pool depth to allow oversummering. Spring-run Chinook salmon may also utilize tailwaters below dams if cold water releases provide suitable habitat conditions. Spawning occurs between September and October and, depending on water temperature, emergence occurs between November and February.

Spring-run Chinook salmon emigration is highly variable (DFG 1998). Some may begin outmigrating soon after emergence, whereas others oversummer and emigrate as yearlings with the onset of increased fall storms (DFG 1998). The emigration period for spring-run Chinook salmon extends from November to early May, with up to 69 percent of young-of-the-year outmigrants passing through the lower Sacramento River between mid-November and early January (Snider and Titus 2000). Outmigrants are also known to rear in non-natal tributaries to the Sacramento River, and the Delta (DFG 1998).

Chinook salmon spend between one and four years in the ocean before returning to their natal streams to spawn (Myers *et al.* 1998). Fisher (1994) reported that 87 percent of Chinook trapped and examined at Red Bluff Diversion Dam (RBDD) between 1985 and 1991 were three-year-olds.

Spring-run Chinook salmon were once the most abundant run of salmon in the Central Valley (Campbell and Moyle 1992) and were found in both the Sacramento and San Joaquin drainages. More than 500,000 spring-run Chinook salmon were caught in the Sacramento-San Joaquin commercial fishery in 1883 alone (Yoshiyama *et al.* 1998). The San Joaquin populations essentially were extirpated by the 1940s, with only small remnants of the run that persisted through the 1950s in the Merced River (Hallock and Van Woert 1959, Yoshiyama *et al.* 1998). Populations in the upper Sacramento, Feather, and Yuba Rivers were eliminated with the construction of major dams during the1950s and 1960s. Naturally-spawning populations of spring-run Chinook salmon currently are restricted to accessible reaches of the upper Sacramento

River, Antelope Creek, Battle Creek, Beegum Creek, Big Chico Creek, Butte Creek, Clear Creek, Deer Creek, Mill Creek, Feather River, and the Yuba River (DFG 1998).

Since 1969, the Central Valley spring-run Chinook salmon ESU has displayed broad fluctuations in abundance, ranging from 1,403 in 1993 to 25,890 in 1982 (DFG unpublished data, 2003). The average abundance for the ESU was 12,590 for the period of 1969 to 1979, 13,334 for the period of 1980 to 1990, and 6,554 from 1991 to 2001. Evaluating the abundance of the ESU as a whole, however, complicates trend detection. For example, although the mainstem Sacramento River population appears to have undergone a significant decline, the data are not necessarily comparable because coded wire tag information gathered from fall-run Chinook salmon returns since the early 1990s has resulted in adjustments to ladder counts at RBDD that have reduced the overall number of fish that are categorized as spring-run Chinook salmon (Colleen Harvey-Arrison, DFG, pers. comm., 2003).

Sacramento River tributary populations in Mill, Deer, and Butte Creeks are probably the best trend indicators for spring-run Chinook salmon abundance. These streams have shown positive escapement trends since 1991, yet recent escapements to Butte Creek, including 20,259 in 1998, 9,605 in 2001 and 8,785 in 2002, are responsible for the magnitude of tributary abundance (DFG unpublished data 2002; 2003). Although recent tributary production is promising, annual abundance estimates display a high level of fluctuation and the overall number of Central Valley spring-run Chinook salmon remains well below estimates of historic abundance.

In the Feather River, nearly all of the historic spring-run Chinook salmon habitat now is inaccessible and a hatchery-sustained population of "spring-run" fish has been genetically mixed with the fall-run Chinook salmon (Yoshiyama *et al.* 1996). Since Oroville Dam now blocks the upstream migration of adult spring- and fall-run Chinook salmon and steelhead in the Feather River, the Feather River Hatchery traps the migrating fish for artificial spawning. Prior to the construction of Oroville Dam, population estimates for the years 1946 through 1963 for spring-run Chinook salmon in the Feather River ranged from 500 to 4,000 fish and averaged 2,200 per year (California Department of Water Resources [DWR] and the U.S. Bureau of Reclamation [BOR] 2001). Following completion of Oroville Dam in 1967, the spring-run Chinook salmon population dropped to 146 fish, but averaged 312 fish per year between 1968 and 1974 (DWR and BOR 2001).

The initial factors that led to the decline of Central Valley spring-run Chinook salmon were related to the loss of upstream habitat behind impassible dams. Since this initial loss of habitat, other factors have contributed to the decline of Central Valley spring-run Chinook salmon and affected the ESU's ability to recover. These include a combination of physical, biological, and management factors such as climatic variation, water management, hybridization, predation, and harvest (DFG 1998). Although protective measures likely have led to recent increases in Central Valley spring-run Chinook salmon abundance, the ESU still is below levels observed from the 1960s through 1990. Because threats to the spring-run Chinook salmon ESU continue to persist,

and because the ESU is confined to relatively few remaining streams and continues to display broad fluctuations in abundance, the population is at moderate risk of extinction.

2. Central Valley Steelhead

NOAA Fisheries listed the Central Valley steelhead ESU as threatened on March 19, 1998 (63 FR 13347). The ESU includes all naturally-produced Central Valley steelhead in the Sacramento-San Joaquin River Basin. NOAA Fisheries published a final 4(d) rule for Central Valley steelhead on July 10, 2000 (65 FR 42422).

All steelhead stocks in the Central Valley are winter-run steelhead (McEwan and Jackson 1996). Steelhead are similar to Pacific salmon in their life history requirements. They are born in fresh water, emigrate to the ocean, and return to freshwater to spawn. Unlike other Pacific salmon, steelhead are capable of spawning more than once before they die.

The majority of the steelhead spawning migration occurs from October through February, and spawning occurs from December to April in streams with cool, well oxygenated water that is available year round. Van Woert (1964) and Harvey (1995) observed that in Mill Creek, the steelhead migration is continuous, and although there are two peak periods, sixty percent of the run is passed by December 30. Similar bimodal run patterns have also been observed in the Feather River (Ryan Kurth, DWR, pers. comm., 2002), and the American River (John Hannon, BOR, pers. comm., 2002).

Egg incubation time is dependent upon water temperature. Eggs held between 50 °F and 59 °F hatch within three to four weeks (Moyle 1976). Fry usually emerge from redds after about four to six weeks depending on redd depth, gravel size, siltation, and water temperature (Shapovalov and Taft 1954). Newly emerged fry move to shallow stream margins to escape high water velocities and predation (Barnhart 1986). As fry grow larger they move into riffles and pools and establish feeding locations. Juveniles rear in freshwater for one to four years (Meehan and Bjornn 1991) emigrating episodically from natal springs during fall, winter, and spring high flows (Colleen Harvey-Arrison, DFG, pers. comm.,1999). Steelhead typically spend two years in fresh water. Adults spend one to four years at sea before returning to freshwater to spawn as four- or five-year-olds (Moyle 1976).

Steelhead historically were well-distributed throughout the Sacramento and San Joaquin Rivers (Busby *et al.* 1996). Steelhead were found from the upper Sacramento and Pit River systems, south to the Kings and possibly the Kern River systems, and in both east- and west-side Sacramento River tributaries (Yoshiyama *et al.* 1996). The present distribution has been greatly reduced (McEwan and Jackson 1996). The California Advisory Committee on Salmon and Steelhead (1988) reported a reduction of steelhead habitat from 6,000 miles historically to 300 miles. The California Fish and Wildlife Plan (DFG 1965) estimated there were 40,000 steelhead in the early 1950s. Hallock *et al.* (1961) estimated an average of 20,540 adult steelhead through the 1960s in the Sacramento River, upstream of the Feather River.

Existing wild steelhead stocks in the Central Valley are mostly confined to upper Sacramento River and its tributaries, including Antelope, Deer, and Mill Creeks, and the Yuba River. Populations may exist in Big Chico and Butte Creeks, and a few wild steelhead are produced in the American and Feather Rivers (McEwan and Jackson 1996). Until recently, steelhead were thought to be extirpated from the San Joaquin River system. Recent monitoring has detected self-sustaining populations of steelhead in the Stanislaus, Mokelumne, Calaveras, and other streams previously thought to be void of steelhead (McEwan 2001). It is possible that naturally-spawning populations exist in many other streams but are undetected due to lack of monitoring programs (Interagency Ecological Program [IEP] Steelhead Project Work Team 1999).

Reliable estimates of steelhead abundance for different basins are not available (McEwan 2001); however, McEwan and Jackson (1996) estimate the total annual run size for the entire Sacramento-San Joaquin system, based on RBDD counts, to be no more than 10,000 adults. Steelhead counts at the RBDD have declined from an average of 11,187 for the period of 1967 to 1977, to an average of approximately 2,000 through the 1990s (McEwan and Jackson 1996, McEwan 2001).

The factors affecting the survival and recovery of Central Valley steelhead are similar to those affecting Central Valley spring-run Chinook salmon and primarily are associated with habitat loss (McEwan 2001). The future of Central Valley steelhead is uncertain because of the lack of status and trend data.

B. Habitat Condition and Function for Species' Conservation

The freshwater habitat of salmon and steelhead in the Sacramento-San Joaquin drainage varies in function, depending on location. Spawning areas are located in accessible, upstream reaches of the Sacramento or San Joaquin Rivers and their watersheds where viable spawning gravels and water conditions are found. Spawning habitat condition is strongly affected by water flow and quality – especially temperature, dissolved oxygen, and silt load – all of which can greatly affect the survival of eggs and larvae.

Migratory corridors are downstream of the spawning areas and include the Sacramento-San Joaquin Delta. These corridors allow the upstream passage of adults and the downstream emigration of outmigrant juveniles. Migratory habitat condition is strongly affected by the presence of barriers which can include dams, unscreened or poorly screened diversions, and degraded water quality.

Both spawning areas and migratory corridors comprise rearing habitat for juveniles, which feed and grow before and during their outmigration. Non-natal, intermittent tributaries also may be used for juvenile rearing. Rearing habitat condition and function may be affected by annual and seasonal flow and temperature characteristics. Specifically, the lower reaches of streams often become less suitable for juvenile rearing during summer. Rearing habitat condition and function are strongly affected by habitat complexity, food supply, and presence of predators of juvenile

salmonids. Some complex, productive habitats with floodplains remain in the system (e.g., the lower Cosumnes River, Sacramento River reaches with setback levees [i.e., primarily located upstream of the City of Colusa]); however, the channelized, leveed, and rip-rapped river reaches and sloughs that are common in the Sacramento-San Joaquin system typically have low habitat complexity, low abundance of food organisms, and offer little protection from either fish or avian predators.

C. Factors Affecting the Species and Habitat

Profound alterations to the riverine habitat of the Central Valley began with the discovery of gold in the mid-1800s which resulted in increased sedimentation, reducing spawning and rearing habitat quality from mining activities and land uses. Other human activities have contributed to the decline in Central Valley anadromous salmonids and their habitats, eventually leading to listing the species under the ESA. These activities are ongoing and continue to affect the species, and include: (1) dam construction and continued use that blocks previously accessible spawning and rearing habitat; (2) water development activities that affect flow quantity, timing, and water quality; (3) land use activities such as agriculture, flood control, urban development, mining, and logging that degrade aquatic habitat and decrease prey abundance; (4) hatchery operation and practices; and (5) harvest activities.

Hydropower, flood control, and water supply dams of the Central Valley Project (CVP), State Water Project (SWP), and other municipal and private entities have permanently blocked or hindered salmonid access to historical spawning and rearing grounds. Large dams on every major tributary to the Sacramento and San Joaquin rivers block Chinook salmon and steelhead access to the upper portions of the respective watersheds. On the Sacramento River, Keswick and Shasta dams block passage to historic spawning and rearing habitat in the upper Sacramento, McCloud, and Pit rivers. On the Feather River, Oroville Dam and associated facilities block passage to the upper Feather River watershed. Nimbus Dam blocks access to most of the American River basin. Englebright Dam and Daguerre Point Dam block access to the upper Yuba River. The upper watersheds of these basins comprised preferred spawning and rearing habitat for Central Valley spring-run Chinook salmon and Central Valley steelhead.

Depleted flows in dammed waterways have contributed to elevated temperatures, reduced dissolved oxygen levels, and decreased recruitment of gravel, large woody debris, and riparian vegetation (Spence *et al.* 1996). Historical seasonal flow patterns included high flood flows in the winter and spring with declining flows throughout the summer and early fall. With the completion of upstream reservoir storage projects throughout the Central Valley, the seasonal distribution of flows differs substantially from historical patterns. The magnitude and duration of peak flows during the winter and spring are reduced by water impoundment in upstream reservoirs. Instream flows during the summer and early fall months have increased over historic levels for deliveries of municipal and agricultural water supplies (CALFED Bay-Delta Program [CALFED] 2000). Water management now reduces natural variability by creating more uniform

flows year-round that diminish natural channel forming, riparian vegetation, and food web functions.

Although many of the factors affecting Chinook salmon are common to steelhead, some stressors –especially elevated summer water temperatures–have greater effects on steelhead because juvenile steelhead rear in freshwater for more than one year. Suitable steelhead conditions primarily occur in mid to high elevation streams. Because most suitable habitat has been lost to dam construction, juvenile rearing is generally confined to lower elevation stream reaches. Many dams and reservoirs in the Central Valley do not have water storage capacity or release mechanisms necessary to maintain suitable water temperatures for steelhead rearing through the critical summer and fall periods, especially during critically dry years (McEwan 2001).

Water diversions for irrigated agriculture, municipal and industrial use, and managed wetlands, are found throughout the Central Valley. Hundreds of water diversions exist along the Sacramento River and its tributaries. Depending on the size, location, and season of operation, unscreened intakes may entrain many life stages of aquatic species, including juvenile salmonids.

About 150 years ago, the Sacramento River was bordered by up to 500,000 acres of riparian forest, with bands of vegetation literally spreading four to five miles (Resources Agency, State of California 1989). By 1979, riparian habitat along the Sacramento River diminished to 11,000-12,000 acres or about 2 percent of historic levels (McGill 1979). More recently, about 16,000 acres of remaining riparian vegetation has been reported (McGill 1987). Degradation and fragmentation of riparian habitat has resulted mainly from flood control and bank protection projects, together with the conversion of riparian land to agriculture (Jones and Stokes Associates 1993).

Increased sedimentation resulting from agricultural and urban practices within the Central Valley is another cause of salmonid habitat degradation. Sedimentation can adversely affect salmonids during all freshwater life stages by clogging or abrading gill surfaces; adhering to eggs, inducing behavioral modifications including habitat avoidance or cessation of feeding, burying eggs or alevins, scouring and filling pools and riffles, reducing primary productivity and photosynthetic activity, and decreasing intergravel permeability and dissolved oxygen levels. Embedded substrates can reduce the production of juvenile salmonids and hinder the ability of some over-wintering juveniles to hide in the gravels during high flow events.

Land use activities associated with road construction, urban development, logging, mining, agriculture, and recreation have significantly altered fish habitat quantity and quality through alteration of streambank and channel morphology, alteration of ambient stream water temperatures, degradation of water quality, elimination of spawning and rearing habitat, fragmentation of available habitats, elimination of downstream recruitment of gravel and large woody debris, removal of riparian vegetation and elimination of large trees, and increased streambank erosion. Large woody debris influences stream morphology by affecting pool formation, channel pattern and position, and channel geometry. Organic input to the water

course also provides nutrients necessary for primary productivity and as a food source for aquatic insects, who in turn are consumed by salmonids.

Hatchery practices as well as spatial, and temporal overlaps of habitat use and spawning activity between spring- and fall-run Chinook salmon has led to the hybridization and homogenization of some subpopulations (DFG 1998). As early as the 1960s, Slater (1963) observed that early fall-run fish were competing with spring-run Chinook salmon for spawning sites in the Sacramento River below Keswick Dam and speculated that the two runs may had hybridized. Feather River hatchery spring-run Chinook salmon have been documented as straying throughout Central Valley streams for many years (DFG 1998), and in many cases have been recovered from the spawning grounds of fall-run Chinook salmon (Colleen Harvey-Arrison and Paul Ward, DFG, pers. comm., 2002). This indicates that Feather River Hatchery spring-run Chinook salmon may exhibit fall-run life history characteristics. Although the degree of hybridization has not been comprehensively determined, it is clear that the populations of spring-run Chinook salmon spawning in the Feather River and counted at RBDD contain hybridized fish.

Accelerated predation may also be a factor in the decline of Chinook salmon and steelhead in the Central Valley. Although predation is a natural component of salmonid ecology, the rate of predation on Central Valley salmonids likely has greatly increased through the introduction of non-native predatory species such as striped bass and largemouth bass, and through the alteration of natural flow regimes and the development of structures that attract predators, including dams, bank revetment, bridges, diversions, piers, and wharfs (Stevens 1961, Vogel *et al.* 1988, Garcia 1989, Decato 1978). FWS staff found that more predatory fish occurred at rock revetment bank protection sites between Chico Landing and Red Bluff than at sites with naturally eroding banks (Michny and Hampton 1984). On the mainstem Sacramento River, high rates of predation are known to occur at RBDD, the Anderson-Cottonwood Irrigation District diversion, the Glenn-Colusa Irrigation District diversion, and at south Delta water diversion structures (DFG 1998). From October 1976 to November 1993, DFG conducted ten mark/recapture experiments at the SWP's Clifton Court Forebay to estimate pre-screen losses using hatchery-reared juvenile Chinook salmon. Pre-screen losses ranged from 69 percent to 99 percent. Predation from striped bass is thought to be the primary cause of the loss (DFG 1998, Gingras 1997).

Chinook salmon are harvested in ocean commercial, ocean recreational, and inland recreational fisheries. Coded wire tag returns indicate that Sacramento River salmon congregate off the coast between Point Arena and Morro Bay. Ocean fisheries have affected the age structure of spring-run Chinook salmon through targeting large fish for many years and reducing the number of four and five year olds (DFG 1998). An analysis of six tagged groups of Feather River Hatchery spring-run Chinook salmon by Cramer and Demko (1997) indicates that harvest rates of three-year-old fish ranged from 18 percent to 22 percent, four-year-olds ranged from 57 percent to 84 percent, and five-year-olds ranged from 97 percent-100 percent. Reducing the age structure of the species reduces it's resiliency to factors that may impact a year class. In-river recreational fisheries historically have taken fish throughout the species' range. During the summer, holding adult spring-run Chinook salmon are easily targeted by anglers when they congregate in large

pools. Poaching also occurs at fish ladders, and other areas where adults congregate, but the significance of poaching on the adult population is unknown.

Several actions have been taken to improve habitat conditions for Central Valley salmonids, including improved management of Central Valley water (e.g., through use of CALFED Environmental Water Account and CVPIA (b)(2) water accounts) and new and improved screen designs at major water diversions along the mainstem Sacramento and San Joaquin Rivers and major tributaries, and changes in ocean and inland fishing regulations to minimize harvest.

IV. ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species within the action area. The environmental baseline "includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process"(50 CFR §402.02).

A. Status of the Listed Species and Habitat within the Action Area

1. The Feather River and Nelson Slough

The action area in the Feather River primarily provides a migration corridor for adult Chinook salmon and steelhead migrating to upstream spawning areas below Oroville Dam, or to summer holding habitat for spring-run Chinook salmon, or to the Feather River Hatchery for hatchery returns. Outmigrating smolts also pass through the action area on their way downstream to the Sacramento-San Joaquin Delta and the ocean. During their downstream migration when flows are high, young salmon and steelhead may use the floodplain habitat in the action area as rearing habitat. The floodplain area includes Nelson Slough, which is adjacent to the northern levee and under low flow conditions is separated from the Feather River by a large area of exposed floodplain. The action area contains riparian habitat within the DFG's Feather River Wildlife Area. The wildlife area provides shaded riverine aquatic (SRA) habitat, overhead canopy cover, and a buffer from urban and agricultural influences.

2. Coon Creek and Ping Slough

The existing SR 99 crossings of Coon Creek and Ping Slough, and some irrigation ditches use culverts. The altered conditions of lower Coon Creek and Ping Slough, in the project area, resulting from channelization, water diversions, and flood control features, do not provide suitable habitat for salmonids (Li 1994). Lower Coon Creek no longer receives its natural stream flows, as most of the flow is intercepted and diverted into East Side Canal upstream of SRs 70

provide some rearing habitat for juvenile salmonids under high flow conditions, as may Nelson Slough when the floodplain in the action area is inundated. The habitat in the action area of the lower Feather River will continue to contribute to the survival and recovery of Central Valley spring-run Chinook salmon and steelhead as long as it continues to provide safe passage conditions for migrating fish.

V. EFFECTS OF THE ACTION

The proposed project includes actions that may adversely affect Central Valley spring-run Chinook salmon and Central Valley steelhead. Construction activities associated with expansion of SR 99 at the Feather River crossing would disturb the stream channel and result in temporary water quality impacts. The removal of riparian vegetation for bridge construction would cause a temporary decrease in SRA habitat and large woody debris. The impacts associated with construction would be minimized by adherence to the July 1 - October 15 period for in-water construction, implementation of BMPs and adherence to the SWPPP, and by replacement of riparian vegetation through restoration. Construction of the bridge piers would slightly reduce the amount of available migration and rearing habitat.

Spring-run Chinook salmon outmigration should be completed by the beginning of the work window on July 1 (Yoshiyama 1998); however, outmigrating juvenile steelhead may be in the action area from June through September (DWR and BOR 2001). Adult spring-run Chinook salmon could still be migrating upstream to holding and spawning areas through the summer months; the peak of the run occurs during May and June, yet may continue through September. Anglers in the Feather River begin catching migrating adult steelhead as early as September in most years. Activities such as conducting test drills, pile driving, erecting cofferdams, and dewatering work areas may affect migrating spring-run Chinook salmon and steelhead. Adult upstream migrants may be temporarily disturbed by in-channel construction, including test drilling, cofferdam construction, and pile driving; however, the disturbance would likely be restricted to daylight hours while construction is ongoing allowing fish to pass relatively undisturbed during nocturnal periods. Juvenile outmigrating steelhead also would be able to pass relatively undisturbed during nocturnal hours; however, during initial cofferdam installation, juvenile steelhead may be displaced or killed by heavy equipment and sheetpile installation. Based on past use of cofferdams, a small number of juvenile steelhead also may be trapped within the cofferdams during the dewatering process. This may result in the death of some individuals, and the capture of others for the purpose of relocation, which also may result in injury or death.

A. Water Quality Impacts

Direct effects of bridge construction and culvert installation include physical disturbance and redistribution of fine sediment in the channel and along the bank causing turbidity. Construction work will require use of heavy equipment, placement of access roads and staging areas, and

mortality; however, based on Caltrans past use of cofferdams, the number of fish that may be affected is expected to be small and therefore is not expected to affect the overall abundance or distribution of salmonids in the action area.

C. Impacts to Riparian Habitat

Riparian vegetation removal or disturbance associated with construction activities may result in a reduction of SRA habitat and decreased bank protection. Shading currently provided by riparian trees that are to be removed will be replaced to a large extent by shading provided by the new bridge structure. Due to the broad width of the Feather River at the bridge site, the amount of overhanging vegetation affected by the project is not expected to affect water temperature; rather, flow and water temperature in the action area is largely controlled by releases from Oroville Dam (DWR and BOR 2001). The riparian corridor upstream and downstream of the project site has a high percentage of canopy cover and instream large woody debris which helps create suitable habitat for salmonids by providing shade, cover, refugia, bank stability, and contributes to food production. Therefore, the disturbance and removal of riparian vegetation associated with the proposed project would be unlikely to affect the distribution and abundance of salmonids in the action area.

D. Test Drilling and Pile Driving Impacts

Prior to construction, test drilling in the live channel of the river would be done from the existing bridge deck. Drilling would create noise levels in the water of approximately 105 decibels (dB). After drilling, a rod is hammered for approximately one minute and a core is extracted; the hammering is approximately 130 dB. This process would occur a few times at each borehole with a maximum of thirty boreholes planned along the length of the new bridge. Approximately eight boreholes would be made in the active channel. Pile driving would occur during bridge pier placement as part of the construction process. This is expected to create noise levels of 150 dB, and to occur over a period of 32 days in each of two construction seasons. Sheet piles and the piles supporting the temporary trestle will be vibrated into place rather than driven. Caltrans has indicated that although pile vibration creates a disturbance in the water column, it's effects on fish are believed to be minor and the noise levels are believed to be relatively low (Suzanne Melim, Caltrans, pers. comm., 2003).

The effect pile driving has on fish depends upon the pressure, measured in dB, of the sound or compression wave created by the activity. Rassmusen (1967) found that immediate mortality of juvenile salmonids may occur at sound pressure levels exceeding 204 dB. Sound pressures sustained for four hours in excess of 180 dB damaged the hair cells in the inner ear of cichlid fish (Hastings *et al.* 1996). In addition to mortality and internal injury, pile driving may induce behavioral responses in fish. Feist *et al.* (1992) found that abundance of juvenile salmon near pile driving rigs in Puget Sound was two-fold greater on non-pile driving days as on pile driving days, indicating that juveniles were startled by the activity and that pile driving caused a temporary avoidance of habitat at the project site. Although the pile driving created sound that

could be detected at least 600 m away from the source at a level within the range of salmonid hearing, salmon at this range did not always exhibit a reaction to the sound (Feist *et al.* 1992). McKinley and Patrick (1986) found that salmon smolts exposed to pulsed sound (similar to pile driving) demonstrated a startle or avoidance response, and Anderson (1990) observed a startle response in salmon smolts at the beginning of a pile driving episode but found that after a few poundings fish were no longer startled.

NOAA Fisheries anticipates that pile driving will be detectable to salmonids up to 600 meters from the source, and that the sounds generated will harass juvenile steelhead by causing injury from temporary disruption of normal behaviors (i.e., due to startling) such as feeding, sheltering, and migrating that may contribute to reduced or negative growth. Disruption of these behaviors may also lead to increased predation if fish become disoriented or concentrated in areas with high predator densities. Adult spring-run Chinook salmon and steelhead that are migrating upstream may be startled by pile driving and may experience daily migration delays. These migration delays are not expected to injure adults because the delays are expected to be brief (i.e., hours) and adult fish commonly hold in deep pools while migrating upstream. The effects of drilling, extracting sediment cores from the bridge site, and pile vibration are expected to be similar to but less than those of pile driving because of the lower noise levels and/or short duration of these activities.

Only a small number of fish are expected to be affected by pile driving because the activity will occur during the July 1 through October 15 work window which avoids the peaks of adult and juvenile migration periods. Additionally, pile driving is expected to occur on fewer than one-third of the days during this period (i.e., 32 days in each of two construction years). Finally, on similar bridge projects, such as the replacement of the I-5 bridge over the Sacramento River near Anderson, lapses in pile driving activity are common throughout the day because construction crews suspend hammer work for equipment maintenance, to shift from one pile to another, and to take breaks (D. Whitley, Caltrans, pers. comm., 2002). These construction lapses will allow fish to migrate through the action area, thereby further minimizing injury. Chinook salmon and steelhead migration often occurs at night, when construction activities typically are suspended. For these reasons, pile driving is not expected to affect the overall abundance and distribution of Central Valley spring-run Chinook salmon or Central Valley steelhead in the Feather River.

E. Culvert Extensions at Coon Creek and Ping Slough

Culvert work is planned at nine irrigation canals and at Coon Creek and Ping Slough. Salmonids are not expected to occur in any of the irrigation canals because the canals constitute poor-quality habitat. Caltrans proposes to extend the existing culverts at Coon Creek and Ping Slough. Anadromous fish returning to Coon Creek travel from the Sacramento River up the Natomas Cross Canal, then up the East Side Canal, and from there access Auburn Ravine, Coon Creek, and several other smaller drainages. Lower Coon Creek, where the existing culvert is located, is downstream from the East Side Canal. Due to lack of flow, this section of Coon Creek has become overgrown with wetland vegetation. Although it may carry flow in the rainy season, it is

unlikely that salmonids would use this lower portion of the creek as it does not provide suitable habitat nor does it provide upstream access to any suitable habitat. Ping Slough is an intermittent stream which also is tributary to the Natomas Cross Canal. Extending the existing box culverts at the two locations is not expected to impact salmonids or their migration primarily because of the low likelihood that salmonids use this habitat. Potential construction impacts from culvert extension would be minimized through BMPs as outlined in the SWPPP, and adherence to the July 1 - October 15 construction window.

VI. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

The highway upgrade project will improve freeway access to portions of Sutter and Yuba counties, and will also facilitate access to areas due north and south. Development in the two counties has increased substantially in the past ten years and is expected to continue as ongoing and future build-out projects are implemented. Agriculture is expected to continue within Sutter County. Sutter County build-out projections forecast build-out to accommodate a projected population increase of approximately 41,068 people, according to the Sutter County General Plan (FHWA and Caltrans 2002).

Potential impacts to salmonids arising from build-out of the Sutter County General Plan may include: (1) degradation of water quality from increased urban stormwater runoff and input of sediment from roads and developments; (2) direct mortality or decrease in vigor of juvenile salmonids resulting from pollutants; (3) direct mortality of eggs due to sedimentation of spawning gravels or increase in water temperature; (4) constriction or removal of the riparian corridor which may result in increased summer water temperatures, decreased dissolved oxygen levels, and lack of woody debris recruitment; and (5) impacts to hydrology resulting in reduced summer base flows and increased magnitude and frequency of peak discharge which may lead to erosion and channel simplification. Examples of other impacts may include human-related intrusion into critical habitat as housing developments are built near creeks and people visit and fish the creeks, build trails, allow their pets access, and fertilize their lawns. Many of these potential impacts may be reduced through public education, worker and neighborhood awareness programs, and coordinated regional planning efforts.

Measures to avoid and minimize impacts may include preservation of riparian habitat through open space designation, not allowing direct discharge of untreated storm-water runoff to enter any water courses, and other design standards which will maintain the integrity of the watercourses, their floodplains, and their ecological processes. Storm-water treatment solutions may be accomplished through development design, as shown in recent development in Portland,

Oregon where parking lots were designed with grassy swales as medians which filter out pollutants before they reach the storm-water conveyance system (Natural Resources Defense Council 2000). Studies have examined the use of constructed wetlands for urban runoff water quality control and show promising results (Strecker *et al.* 1992, Environmental Protection Agency 1999, Schueler 2000).

VII. CONCLUSION

After reviewing the best available scientific and commercial information, the current status of Central Valley spring-run Chinook salmon and Central Valley steelhead, the environmental baseline for the action area, the effects of the proposed SR 99 Safety and Operational Improvement Project, and the cumulative effects, it is NOAA Fisheries' biological opinion that construction of the project, as proposed, is not likely to jeopardize the continued existence of Central Valley spring-run Chinook salmon or Central Valley steelhead. There currently is no critical habitat designated for these species; therefore, none will be affected.

NOAA Fisheries anticipates that some construction activities associated with the proposed project may result in incidental take of Central Valley spring-run Chinook salmon and Central Valley steelhead. Specifically, take of juvenile steelhead may occur during installation and dewatering of cofferdams, from fish salvage, and during pile driving. While such take is expected to be rare, an incidental take statement is included with this biological opinion for these actions.

VIII. INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NOAA Fisheries as an act which kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by FHWA and Caltrans so that they become binding conditions of any grant or permit, as appropriate, for the exemption in section 7(o)(2) to apply. FHWA has a continuing duty to regulate the activity

covered by this incidental take statement. If FHWA (1) fails to assume and implement the terms and conditions, or (2) fails to require Caltrans to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Caltrans must report the progress of the action and its impact on the species to NOAA Fisheries as specified in the incidental take statement [50 CFR §402.14(i)(3)].

A. Amount or Extent of Take

No incidental take of Central Valley spring-run Chinook salmon or Central Valley steelhead during the construction of Segment 1 of the SR 99 Safety and Operational Improvement project is expected or authorized. In Segment 2, migrating juvenile Central Valley spring-run Chinook salmon are not expected to be present during instream construction activities, and project effects on adult Central Valley spring-run Chinook salmon and adult Central Valley steelhead from activities such as pile driving are not expected to cause injury; no incidental take of these life stages during the construction of Segment 2 is expected or authorized.

NOAA Fisheries anticipates that the SR 99 Safety and Operational Improvement project will result in incidental take of juvenile Central Valley steelhead during the construction of Segment 2. Incidental take associated with this action is expected to be in the form of harassment to juvenile steelhead in the Feather River resulting from cofferdam installation and dewatering, fish salvage, and pile driving. Some mortality (<10 percent of all fish collected) is anticipated from conducting fish salvage within cofferdams.

NOAA Fisheries cannot, using the best available information, quantify the anticipated incidental take of individual juvenile steelhead because of the variability and uncertainty associated with the population size of each species, annual variations in the timing of migration, and uncertainties regarding individual habitat use of the project area. However, it is possible to describe the conditions that will lead to the take and use those conditions as a surrogate for defining the amount of incidental take anticipated to occur. Specifically, take during the construction of Segment 2 is not expected to exceed that related to the following in-channel construction activities in the Feather River between July 1 and October 15 for the years 2007 through 2009: (1) cofferdam construction and dewatering sufficient to install 12 in-water bridge piers, and associated fish salvage that will kill up to ten percent of all fish captured; and (2) drilling, sediment core extraction, pile vibration, or pile driving at or below 150 dB that may affect fish in a 600 m radius from the pile driving source, with pile driving to install the bridge piers limited a maximum of 32 days per season for two seasons. No incidental take is expected to result from project effects such as temporary increases in turbidity, temporary disturbance of upland habitat, and permanent in-channel habitat loss not to exceed 0.25 acres.

Anticipated incidental take may be exceeded if project activities exceed the criteria described above, if the project is not implemented as described in the biological assessment for the SR 99 Safety and Operational Improvement project (Caltrans 2002) and other supporting documents, if

the proposed conservation measures listed in the *Description of the Proposed Action* section are not implemented, or if the project is not implemented in compliance with the terms and conditions of this incidental take statement.

B. Effect of the Take

In this biological opinion, NOAA Fisheries has determined that the level of anticipated take is not likely to result in jeopardy to Central Valley spring-run Chinook salmon or Central Valley steelhead.

C. Reasonable and Prudent Measures

NOAA Fisheries believes the following reasonable and prudent measures are necessary and appropriate to avoid or minimize take of Central Valley spring-run Chinook salmon and Central Valley steelhead:

1. Measures shall be taken to avoid or minimize injury to Central Valley spring-run Chinook salmon and Central Valley steelhead during bridge construction.

2. Measures shall be taken to avoid or minimize impacts to aquatic habitat during bridge construction, culvert replacement, and continued use of the highway.

D. Terms and Conditions

FHWA and Caltrans are responsible for compliance with the following non-discretionary terms and conditions that implement the reasonable and prudent measures described above:

1. Measures shall be taken to avoid or minimize injury to Central Valley spring-run Chinook salmon and Central Valley steelhead during bridge construction.

> a. A fish salvage plan shall be written by Caltrans and approved by NOAA Fisheries prior to bridge construction. The plan shall be coordinated with a biologist from the NOAA Fisheries, Sacramento Area Office, before it is undertaken, and must be implemented by a qualified fishery biologist using approved methodology. If listed fish are found within the area confined by the cofferdam, prior to dewatering, the fishery biologist shall use one or more of the following NOAA Fisheries-approved gears to capture the fish: dip net, seine, throw net, minnow trap, or hand. The biologist shall note the number and condition of individuals, and the date and time of collection and relocation, and submit this information to NOAA Fisheries, Sacramento Area Office. Any capture and relocation, mortality, or other incidental take of Chinook salmon or steelhead must be reported within 48 hours to NOAA Fisheries by telephone (916) 930-3600, or fax (916) 930-3629. No incidental take of Central Valley spring-run Chinook salmon is expected or authorized; therefore, if Chinook salmon are taken, NOAA

Fisheries will review the activities resulting in take to determine if additional protective measures are required.

b. Pile driving shall be conducted only during daylight hours to avoid crepuscular and nocturnal migration periods of Chinook salmon and steelhead.

c. Underwater sound levels associated with pile driving shall be monitored to ensure sound levels do not exceed 150 dB at a distance of 10 meters from the pile. If sound levels do exceed this threshold, pile driving must stop and NOAA Fisheries must be notified within 48 hours by telephone at (916) 930-3600, or by fax at (916) 930-3629. Before pile driving may continue, additional protective measures will be determined by NOAA Fisheries and Caltrans; these measures may include monitoring to determine the presence or absence of salmonids in the area, and changing the pile driving intensity or duration.

2. Measures shall be taken to avoid or minimize impacts to aquatic habitat during bridge construction, culvert replacement, and continued use of the highway.

a. FHWA and Caltrans shall ensure that BMPs are employed during construction to avoid and minimize disturbance to the river banks and channel to the maximum extent possible including, but not limited to, the BMPs described in Appendix F of the biological assessment and in the conceptual SWPPP (Appendix A of this document).

b. The final bridge design shall be provided for NOAA Fisheries' review and approval and shall include specifications regarding areas where riparian vegetation will be removed and replanted, chemical treatment and storage location of construction materials, identification and uses of staging areas, type and source of construction materials to be placed in the stream channel, types and timing of activities to occur directly in the channel and on the banks, and details of the clean-up process and removal of materials from the site. NOAA Fisheries must approve of final design and specifications at least 90 days prior to construction.

c. Removal of riparian vegetation shall be avoided as much as possible, and replacement shall occur at a 3:1 ratio on-site or within close proximity on the Feather River. When the riparian restoration plan is completed a copy shall be sent to NOAA Fisheries at the following address:

Supervisor, Protected Resources Division
National Marine Fisheries Service
Sacramento Area Office
650 Capitol Mall, Suite 8-300
Sacramento, CA 95814

d. The bridge and adjacent highway design shall not allow stormwater from any road or bridge surface to be directly discharged to any drainage during construction and in perpetuity.

e. Stream channel disturbance shall be kept to a minimum, and no extraneous construction material shall be left in the channel. If bridge footings are to be protected by rock, the channel bottom elevation must not be elevated above the natural channel bottom. No fill material, including concrete, beyond that identified in the project description, shall be allowed to enter any waters of the U.S. In-channel construction materials must be non-toxic to aquatic life.

f. Water pumped from within the confines of cofferdams which may be turbid shall not be allowed to re-enter the stream channel unless sediment has settled out, resulting in no increase in turbidity in any waters of the U.S. Water that contacts wet concrete and has a pH greater than 9 must be disposed of outside the stream channel and away from the riparian zone or any wetland area.

g. During construction, all equipment refueling and maintenance shall occur outside the channel and riparian area, except for the drill rig or other stationary equipment. To minimize the potential for fluid leaks during operation, refueling, or maintenance, spill control absorbent material shall be placed under all stationary equipment. Any spill of hazardous material must be reported to NOAA Fisheries within 48 hours by telephone at (916) 930-3600, or by fax at (916) 930-3629.

IX. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on a listed species or critical habitat, to help implement recovery plans, or to develop information.

1. FHWA and Caltrans should participate in development of a regional population growth management plan to ensure impacts of the associated growth in Sutter and Yuba Counties do not contribute to degradation of Chinook salmon or steelhead habitat components such as water quality, flow conditions and releases, and riparian vegetation.

2. FHWA or Caltrans should explore other opportunities within the Feather River or Coon Creek drainage to restore, create, or preserve SRA habitat.

In order for NOAA Fisheries to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, NOAA Fisheries requests notification of the implementation of any conservation recommendations.

X. REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the proposed Sutter 99 Safety and Improvement project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal involvement or control over the action has been retained (or is authorized by law), and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

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Appendix A

Conceptual Storm Water Pollution Prevention Plan
Sutter 99 Segments 1, 2, and 4 Roadway Widening

Introduction

This project proposes improvements to State Route 99 (SR 99) to increase capacity and improve operation and safety. The project includes the following improvements: from the SR 99/70 junction to Sacramento Avenue SR 99, the existing roadway will be widened from 2 lanes to 4 lanes with a median/left-turn lane. From Central Avenue to SR 113, a new 4-lane expressway will be constructed south of the existing alignment to bypass the town of Tudor, and from SR 113 to O'Banion Road, SR 99 will be widened from 2 lanes to 4 lanes with a median/left-turn lane.

Project Background

For construction and programming purposes, the 2-lane section of SR 99 from the SR 99/70 junction to O'Banion Road was divided into the following segments (see Exhibit A and Exhibit B):

- Segment 1 begins near the SR 99/70 separation (KP 13.9, PM 8.7) and ends at Nicolaus Road (KP19.0, PM 11.8), just south of the Feather River Bridge.
- Segment 2 begins 0.3 km north of Power Line Road at KP 17.7 (PM 11.0) and ends 1.0 km north of Sacramento Avenue (KP 23.0, PM 14.3).
- Segment 3 begins 1.0 km north of Sacramento Avenue and ends 0.5 km south of Wilkie Avenue (KP 29.2, PM 18.2). This segment has already been improved (September 2000) to a 4-lane conventional highway with a continuous 3.6-m median/left-turn lane and is not a part of this project.
- Segment 4 begins just north of Central Avenue (KP 27.0, PM 16.8) and ends 0.6 kilometers north of O'Banion Road (KP 37.0, PM 23.0).

At the request of the Federal Highway Administration, an Environmental Impact Report/Environmental Assessment (EIR/EA) has been prepared for Segments 1, 2, and 4 of SR 99. This Environmental Document will cover improvements to SR 99 from the SR 99/70 junction to just north of O'Banion Road, with the exception of Segment 3 (EA 03-43490), a recently completed 4-lane section from Sacramento Avenue to Wilkie Avenue.

The local, regional and state transportation plans recognize the importance of providing increased accessibility to the cities and towns within the 70/99 corridor. Both SR 99 and the southern segments of SR 70 are lifelines for agricultural commerce through the northern Central Valley of California.

Project Need and Purpose

The purpose of this project is to improve traffic operations and safety on SR 99 in Sutter County from the SR 99/70 junction to Sacramento Avenue and from Central Avenue to O'Banion Road.

Based on traffic counts from the year 1998 and traffic volumes book ("1998 Traffic Volumes on California State Highways"), the SR 99 corridor from south of Yuba City to the SR 99/70 junction in Sutter County operated at a LOS D (Level of Service), (high density, stable flow). If no improvements are made, the LOS will deteriorate to F (congestion) by the year 2015, based on traffic modeling forecasts, which would fall below the route concept LOS D established by Sutter County and Caltrans for this corridor.

Some of the fatal accidents in this corridor were associated with the risk some drivers take while passing slower vehicles. Adding one travel lane in each direction will accommodate existing and future volumes of traffic at LOS D or better as identified in the local general plans. Safety will be improved as a result of the ability of vehicles to pass slower vehicles and the availability of a refuge for left turning vehicles in the median.

Stormwater Introduction

Caltrans has a comprehensive and coordinated statewide effort to prevent pollution in storm water runoff from Caltrans facilities. The Caltrans Stormwater program is regulated under the Statewide National Pollutant Discharge Elimination System (NPDES) permit no. 99-06-DWQ. Caltrans is required to meet the requirements of section 301, 401,402, and 404 of the Clean Water Act, which requires pollutants be controlled to the Maximum Extent Practicable (MEP). Caltrans must also use the Best Available Technology Economically Achievable/Best Conventional Technology for construction projects.

The highway 99 widening project includes the construction of a new bridge east of the existing Feather River Bridge. This segment of the project poses the greatest potential for pollution to a sensitive water body. The Feather River is the receiving water of concern for this project and is known to have populations of Central Valley spring-run Chinook salmon and Central Valley steelhead, both of which are on the Federally threatened species list, as well as candidate species, Central Valley fall-run Chinook salmon. The greatest risk to these species occurs during construction where large amounts of sediment could potentially be released into the river. Sediments released into a river can cover essential spawning beds or smother the developing eggs. A decrease in oxygen levels is a consequence of sediment releases to the river. This oxygen depleting sediment release can negatively affect aquatic species if not minimized.

Streambed alluvium may contain other trace pollutants, such as heavy metals. The Feather River is a water body of special concern because it is included on the EPA-303-D list for impaired water bodies. The impairment to its beneficial uses is caused by elevated levels of Diazinon, Group A pesticides, Mercury, and unknown toxicity. Caltrans highway runoff is not a likely

contributor to pesticide impacts because pesticides are not used for roadside maintenance within the vicinity of the Feather River; however, since there could possibly be low levels of mercury contained in the sediments from historic mining operations within the project area, excessive amounts of sediment disturbance in the project area could lead to a short increase in mercury level. This construction project will not add mercury to the stream directly; however, if sufficient alluvium is disturbed there is potential to aggravate the buried mercury above the ambient levels. These levels are short lived due to the settling out and burying of the disturbed sediment due to the deposition of natural upstream sediment loading. To prevent any short-term increases in heavy metals during construction, Best Management Practices (BMP) must be used to mitigate sediment releases to the river. This is especially true when construction activity is located in the active streambed.

To mitigate the effects of construction on the aquatic species of the Feather River, Caltrans will require the contractor to submit a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP is a pollution prevention program required for all construction projects over 1 acre. Federal Law, specifically the Clean Water Act, requires a SWPPP in areas where there is a potential to negatively affect water quality. Because of the sensitive species present in the Feather River floodplain channel, Caltrans will provide the contractor with a list of the minimum required BMPs as part of the construction informational handout separate from the bid documents. The contractor may use these BMPs or choose other approved BMPs that provide equal or greater protection of water quality. The Contractor will include these BMPs into their SWPPP, which must be approved by the Caltrans Resident Engineer and requesting agencies prior to the start of construction.

Storm Water Manuals

Caltrans has assembled a number of manuals to provide direction to contractors and Caltrans staff on the implementation and design of storm water controls during the planning, design, and construction of highways. Prior to preparation of the SWPPP the contractor shall reference the most recent manual editions.

The manuals and documents include the following:

1. Caltrans Statewide NPDES permit
2. Caltrans Statewide Storm Water Management Plan
3. Caltrans Statewide Storm Water Quality Practice Guidelines
4. Caltrans Project Planning and Design Guide
5. Caltrans Construction Site Best Management Practices (BMP) manual
6. Caltrans Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual

These materials provide Caltrans and their contractors the guidance and direction to implement highway projects that meet Federal law and provide protection of water quality.

General Construction BMPs

The construction of the Feather River Bridge has been identified as the most sensitive segment of the project in regards to impacting water quality. The BMPs used to protect the water quality of the river include the following:

1. Avoid soil disturbances where possible:
    a. Caltrans Structures is investigating alternative designs to avoid construction activity in the active streambed.
    b. Caltrans is designing the project to avoid as much vegetation as possible.

2. Where vegetation disturbances are necessary, appropriate BMPs will be used to mitigate their impacts:
    a. Vegetation areas will be restored with plantings
    b. Native riparian vegetation will be revegetated
    c. Disturbed soils will be graded and stabilized
    d. Areas prone to erosion will be protected with rock

3. Construction Scheduling:
    a. Construction will occur when the water levels are low and outside of the fall, when salmon and steelhead are within the river system and sensitive to construction activities.
    b. During the October 15 through April 15 rainy season, Caltrans will provide BMPs to control runoff and avoid floodplains and water conveyance systems where possible.

BMPs Needed For SWPPP

Caltrans Construction Site Best Management Practices Manual has working details for Temporary BMPs that will be used during construction. Index notation subject to change with manual revisions; please reference the most current manual edition at time of SWPPP preparation and implementation. The following BMPs will be used during the construction project:

1. SS-1 Scheduling
2. SS-2 Preservation of Existing Vegetation
3. SS-3 Hydraulic Mulch
4. SS-4 Hydroseeding
5. SS-5 Soil Binders
6. SS-6 Straw Mulch
7. SS-7 Geotextiles, Plastic Covers and Erosion Control Blankets/Mats
8. SS-9 Earth Dikes/Drainages Swales and Ditches
9. SC-1 Silt Fence
10. SC-4 Check Dams
11. SC-5 Fiber Rolls

12. NS-1 Water Conservation Practices
13. NS-2 Dewatering Operations
14. NS-3 Paving and Grinding Operations
15. NS-6 Illicit Connection/Connection Discharge Detection and Reporting
16. NS-8 Vehicle and Equipment Cleaning
17. NS-9 Vehicle and Equipment Fueling
18. NS-10 Vehicle and Equipment Maintenance
19. WM-2 Material Use
20. WM-3 Stockpile Management
21. WM-4 Spill Prevention and Control
22. WM-5 Solid Waste Management
23. WM-8 Concrete Waste Management

Appendix A: Abbreviations, Acronyms, and Definitions of Terms

The conceptual storm water pollution prevention plan is a dynamic document that will evolve as the design nears completion. Certain phases of the project pose a greater threat to Water Quality and will require more specific details and drawings. For example, the type and location of the substructures and piles for the new bridge will require a conceptual plan for stormwater protection when the design is final. The details of these Best Management Practices will be coordinated with the respective regulatory agencies as they develop and will be provided to the construction contractor for incorporation into the final SWPPP.

Magnuson-Stevens Fishery Conservation and Management Act (MSA)

ESSENTIAL FISH HABITAT CONSERVATION RECOMMENDATIONS

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) set forth new mandates for the National Marine Fisheries Service (NOAA Fisheries), regional fishery management councils, and Federal action agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NOAA Fisheries, are required to delineate "essential fish habitat" (EFH) in fishery management plans (FMPs) or FMP amendments for all managed species. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NOAA Fisheries regarding potential adverse effects of their actions on EFH.

I. IDENTIFICATION OF ESSENTIAL FISH HABITAT

Essential fish habitat is defined in the MSA as: "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity..." NOAA Fisheries regulations further define "waters" to include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" to include sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" to mean the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" to cover a species' full life cycle.

The geographic extent of freshwater EFH for the Pacific coast salmon fishery includes waters currently or historically accessible to salmon within specific U.S. Geological Survey hydrologic units (Pacific Fishery Management Council [PFMC] 1999). For the lower Feather River and Coon Creek, the aquatic areas that may be identified as EFH for Pacific salmon are within the hydrologic unit map numbered 18020106 and 18020109, respectively.

The biological opinion for the State Route (SR) 99 Safety and Operational Improvement project addresses Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*), which are listed under the both the Endangered Species Act (ESA) and the MSA and potentially will be affected by the proposed action. This EFH consultation will concentrate on Central Valley fall-run Chinook salmon (*O. tshawytscha*) because they are covered under the MSA but not listed under the ESA.

Central Valley fall-run Chinook salmon enter the Sacramento and San Joaquin Rivers from July through April and spawn from October through December (U.S. Fish and Wildlife Service 1998), with spawning occurring from October through December (Myers *et al.* 1998). Peak spawning

occurs in October and November (Reynolds *et al.* 1993). Chinook salmon spawning generally occurs in swift, relatively shallow riffles or along the edges of fast runs at depths greater than 6 inches, usually 1 to 15 feet. Preferred spawning substrate is clean loose gravel and gravels are unsuitable when they have been cemented with clay or fines or when sediments settle out onto redds reducing intergravel percolation (NOAA Fisheries 1997).

Egg incubation occurs from October through March, and juvenile rearing and smolt emigration occurs from January through June (Reynolds *et al.* 1993). At the time of emergence from their gravel nests, most fry disperse downstream towards the estuary shortly after they emerge or as smolts (Kjelson *et al.* 1982), hiding in the gravel or stationing in calm, shallow waters with fine sediments substrate and bank cover such as tree roots, logs, and submerged or overhead vegetation. Juvenile rearing occurs from January through mid May and the smaller fry inhabit marginal areas of the river, particularly back eddies, behind fallen trees, undercut tree roots or over areas of bank cover (Lister and Genoe 1970). Juvenile emigration occurs from mid-March through mid-June. Chinook salmon fry prefer slower velocity streambank areas and orient upstream to the current as opposed to the smolt stage that swims downstream with the current (Schaffter 1980). As they grow, the juveniles associate with coarser substrates along the stream margin or farther from shore (Healey 1991). Along the emigration route, submerged and overhead cover in the form of rocks, submerged aquatic vegetation, logs, riparian vegetation, and undercut banks provide food, shade and protect juveniles from predation.

Principal foods of Chinook salmon while rearing in freshwater and estuarine environments are larval and adult insects and zooplankton such as Daphnia, flies, gnats, mosquitoes or copepods (Kjelson *et al.* 1982), stonefly nymphs or beetle larvae (Chapman and Quistdorff 1938), as well as other estuarine and freshwater invertebrates.

II. DESCRIPTION OF PROPOSED ACTION

The proposed action is described in the preceding biological opinion (Enclosure 1).

III. EFFECTS OF THE ACTION

Potential impacts of the State Route 99 (SR) Safety and Operational Improvement project to Pacific coast salmon EFH would be similar to the effects of the action discussed in the preceding biological opinion concerning impacts to threatened Central Valley steelhead and spring-run Chinook salmon. These impacts primarily would occur in the Feather River as a result of bridge construction, and may include (1) disturbance from in-channel construction activities; (2) degradation of water quality from increased suspended sediment or other pollutants; (3) permanent loss or degradation of EFH at the project site; and (4) creation of areas of potential entrapment within cofferdams during construction.

The majority of salmonid outmigration should be completed by the beginning of the work window on July 1 (Yoshiyama *et al.* 1998); however, some outmigrating fall-run Chinook salmon may be present in the action area in July. Adult spring-run Chinook salmon could still be migrating upstream to holding and spawning areas through the summer months; the peak occurs during May and June, yet the run may continue through September. Adult fall-run Chinook salmon may be pass through the action area from August through October during their spawning migration.

IV. CONCLUSION

Upon review of the effects of the proposed SR 99 Safety and Operational Improvement project, NOAA Fisheries believes that the project may adversely affect the EFH for Pacific salmon due to disturbance of substrate, degradation of water quality, and loss or degradation of SRA habitat.

V. EFH CONSERVATION RECOMMENDATIONS

NOAA Fisheries recommends that Terms and Conditions 1b - c, 2a, and 2c - g, listed in the Incidental Take Statement of the preceding biological opinion be adopted as EFH Conservation Recommendations. In addition, NOAA Fisheries recommends that the two ESA Conservation Recommendations be adopted as EFH Conservation Recommendations.

VI. FHWA's STATUTORY REQUIREMENTS

Section 305(b)4(B) of the MSA requires FHWA to provide NOAA Fisheries with a detailed written response within 30 days, and 10 days in advance of any action, to the EFH conservation recommendations, including a description of measures adopted by FHWA for avoiding, minimizing, or mitigating the impact of the project on EFH (50 CFR 600.920[j]). In the case of a response that is inconsistent with our recommendations, FHWA must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NOAA Fisheries over the anticipated effects of the proposed action and the measures needed to avoid, minimize, or mitigate such effects.

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